

Malden Mills

Background

Malden Mills, a family-owned textile mill based in Lawrence, Massachusetts, has annual sales of \$400 million and is the exclusive producer of Polartec® and Polarfleece® synthetic fabrics, and various other upholstery fabrics. Henry Feuerstein, grandfather of current CEO and owner Aaron Feuerstein, founded Malden Mills in 1906. When a fire destroyed three out of ten buildings on its complex in December 1995, Aaron Feuerstein decided to rebuild the mill rather than relocate or dissolve the business. He later won numerous accolades for his decision to continue paying employees for three months while the mill was being rebuilt.

Project Description

The CHP project was implemented in two phases. The first phase of the project involved the installation of two Solar Centaur turbines with heat recovery steam generators. Each unit is rated at 4.2 MW and 23,800 lbs/hr of steam. The second phase of the project in 1999 involved retrofitting both turbines with ceramic combustor liners to reduce NO_x emissions to 15 parts per million (ppm).

Malden Mills Cogeneration Plant Operating Data for 1999*	
Project Design Capacity (MW _e)	8.4
Power to Heat Ratio	0.6
Total Net Efficiency (HHV)	71%
% Fuel Savings ¹	8% (740 metric tons carbon)
Effective Electric Efficiency (HHV) ²	60%
% NO _x Decrease ³	84% (83 tons)

**Data based on 8,760 annual hours of operation*

Success Strategy

When Malden Mills first submitted a plan for a cogeneration facility in 1992, the Massachusetts Department of Environmental Protection rejected it on grounds that without additional controls the plant would not meet the state's NO_x emission standards. After the fire, the company intended to rebuild the facility and incorporate a CHP system. In order to comply with environmental regulations Malden Mills collaborated with The Department of Energy's Advanced Turbine System (ATS) program. The company proposed an ultra-low-NO_x CHP system built through the ATS program in 1997, for which the state granted a technology demonstration permit.

¹ Savings based on 50% efficient electric and 80% efficient thermal generation with natural gas as the primary fuel.

² Effective Electric Efficiency = (CHP power output)/(Total energy input to CHP system – total heat recovered/0.8). Assumes thermal output provided at 80% efficiency.

³ Compared to electric emissions of 3.6 lb NO_x/MWh (1998 national average) and boiler emissions of 0.1 lb NO_x/MMBtu.

To comply with the air permit and achieve additional emissions reductions Malden Mills installed continuous fiber ceramic composite combustion liners on the two Solar Centaur turbines in 1999. This technology provided a substantial environmental benefit and decreased the facility's NO_x emissions by 40 percent, from 25 ppm to 15 ppm.

Benefits

Besides saving Malden Mills \$1 million annually, the project reduces pollutant emissions. The annual NO_x reduction from the facility is equivalent to the annual emissions from 4,300 vehicles. The project benefits the climate since it uses 8% less fuel, annually saving 52 million standard cubic feet of natural gas, and releasing 3,000 fewer tons of CO₂ each year than separate heat and power. This is the equivalent of planting 810 acres of forest or displacing the annual greenhouse gas emissions from 270 households.

In March 2000, the United States Environmental Protection Agency and the Department of Energy recognized the pollution prevention benefits of this CHP facility with a Certificate of Recognition. For more information on ENERGY STAR® CHP awards, please click [here](#).